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Some horticultural Fern Variations

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The variations to be dealt with here exist in the tropical fern genus *Nephrolepis*, of which one or two species occur wild in the United States in Florida. Some of the variations found in this genus have been found as wild forms but the large majority are only known from their occurrence under cultivation in florists' greenhouses. They are none the less of interest to students of wild forms not only because of their intrinsic interest, but because in some cases they show differences similar to those existing between distinct species of wild ferns.

In other words, we have in the variations of *Nephrolepis* an illustration of one possible way in which species may have been differentiated. In about fifteen years more than fifty distinct forms have arisen from one species, *Nephrolepis exaltata*. Of course these fifty new forms are not all separated inter se by what would be considered specific differences. Some of the forms very closely resemble each other, but it is a most interesting fact that in some such cases the very similar kinds have a very diverse origin, a circumstance which probably often finds a parallel among wild forms, and which indeed may explain the anomalous distribution of a fern like *Asplenium platyneuron*, in America and South Africa, not to cite others. It is also safe to say that the well-distinguished varieties among this group of fifty would, if brought in separately from the tropics, be readily accorded specific rank. It may be added, that, paradoxically, the variations of this one species have gone beyond the commonly accepted generic limits of *Nephrolepis*.

The variations to be considered here have all arisen from the one species, *N. exaltata*. Other species of *Nephrolepis* have also given rise to somewhat similar

horticultural variations but in small numbers, probably because they are much less widely cultivated than *exaltata*. This species has been cultivated more than fifty years, in increasing amounts as time passed. By 1895 it had become a comparatively well-known house plant with the popular name of "sword fern." About this time florists became aware that they were growing under this name two different ferns, one rigid, rather erect-leaved, with plane pinnae, and spore-fertile, the other more flexible, drooping, with slightly undulated pinnae, and mainly, if not entirely, spore-sterile, reproducing only by runners. These two forms are said to have been referred to the late George E. Davenport of the Fern Society for diagnosis, the second form being named by him *N. exaltata bostoniensis* because of its prevalence and possible origin near Boston.

The old sword fern then practically went out of existence as a trade species, and the Boston fern was grown in ever increasing numbers. Nowadays the few dealers who advertise the sword fern or *N. exaltata* seem always to have it confused with other species, *N. cordifolia* or "*N. tuberosa*." True *exaltata*, as I consider it, I know only as Porto Rican plants collected for the New York Botanical Garden.

The fifty varieties already referred to have all come from the Boston variety of *N. exaltata*. Beginning about 1900 there has been an increasing number of new forms appearing in the greenhouses each year. About fifty have been named as commercial varieties. Probably almost an equal number have been discarded or are still held for further tests to determine their value. It has been my privilege to study these forms in two ways; first, by frequent visits to the establishments of commercial growers where I have seen them literally by the hundred thousand; second, by assembling at the Brooklyn Botanic Garden a collection of all obtainable varie-

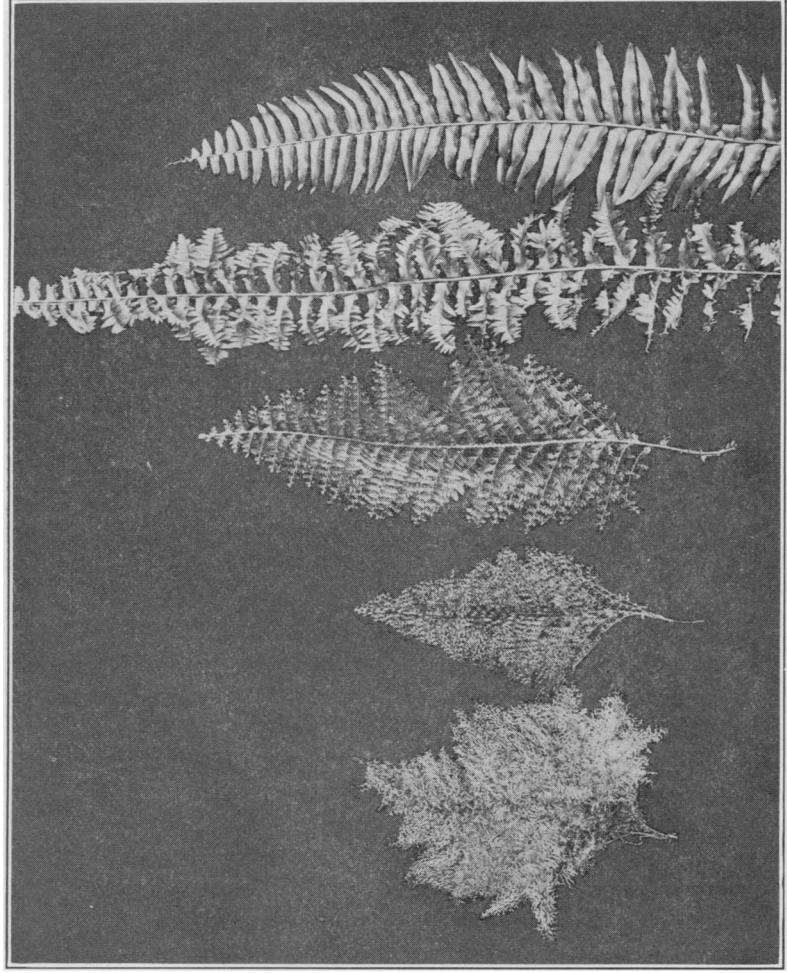
ties for closer study and experiment. This collection now numbers over seventy different varieties, named and unnamed, and I have ordered for delivery in the near future all European forms catalogued, besides commissioning collectors in the tropics to send me wild forms.

The varieties of *N. exaltata bostoniensis* may be roughly classified under three heads: (1) variations which show increase in the amount of division; (2) variations showing increase in the undulation of the pinnae; (3) variations showing various degrees of dwarfing. Besides these, the forking of pinnae and leaf tips, the "fish-tail" variation, as the florist calls it, is also rather common. Perhaps the most interesting fact about these variations is that they are nearly all progressive or orthogenetic; i. e., each new form along any given line seems to carry the potentiality of producing another sport showing the same new character in greater development. This is well illustrated in the series shown in Plate 1.

The forms represented in Plate 1 illustrate progressive variation along the line of increased division of the leaf. The relationships can be well indicated by setting down the technical scientific names of the different varieties pictured with the figure numbers and amount of division.

<i>Fig.</i>	<i>Name</i>	<i>Amount of division</i>
1.	<i>N. exaltata bostoniensis</i>	1-pinnate
2.	<i>N. exaltata bostoniensis</i> <i>Piersoni</i>	2-pinnate
3.	<i>N. exaltata bostoniensis</i> <i>Piersoni</i> <i>Whitmani</i>	2-3-pinnate
4.	<i>N. exaltata bostoniensis</i> <i>Piersoni</i> <i>Whitmani</i> <i>gracillima</i>	3-pinnate
5.	<i>N. exalt. bost. Piers.</i> (<i>Whitmani</i> ?) <i>Smithi</i> <i>Craigi</i>	5-pinnate

It should be noted that the varieties *Piersoni* and *Whitmani* were really separated in origin by another form, *Barrowsi*, which was not available when the illustration was made. The complete history of the origin of the 5-pinnate form, *Craigi*, is uncertain. It may have come through another sport than *Whitmani* but this



VARIETIES SHOWING PROGRESSIVE INCREASE IN THE DIVISION OF THE LEAF. (Named from right to left)
1, *bostoniense*. 2, *Piersoni*. 3, *Whitmani*. 4, *gracillima*. 5, *Craigii*.

will serve to indicate the probably course of its evolution. *Smithi*, its immediate ancestor, is a four-pinnate form, which presumably came from a form like *Whitmani* or *gracillima*, if not from one of these. The progressive decrease in leaf-length shown in the illustration is probably not to be considered as progressive dwarfing, but merely as correlated with the increase in division.

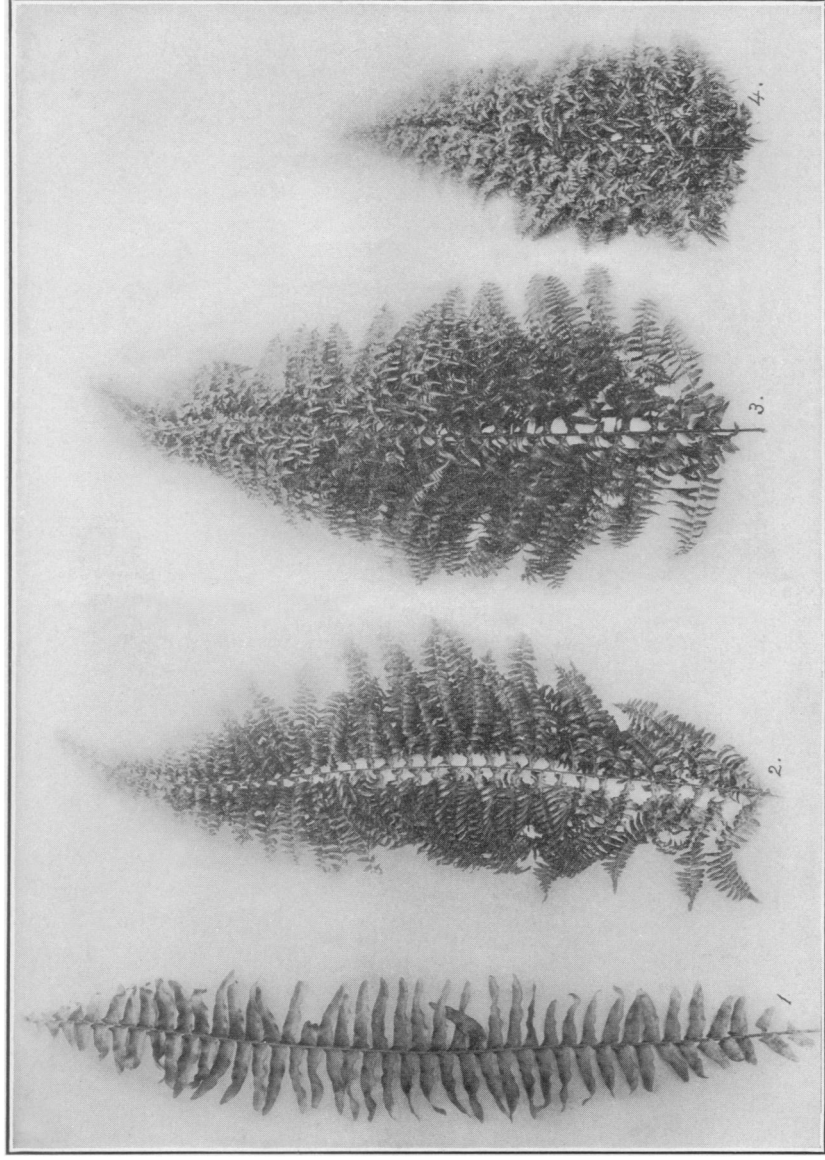
The forms represented on the other two plates illustrate variations which can only be briefly indicated here. All of them are Pierson forms (*bostoniensis* of course excepted), i. e., they have originated in the establishment of F. R. Pierson, Tarrytown, N. Y., which has been most prolific of new and interesting varieties.¹

The origin of *bostoniensis* and *Piersoni* (Plate 2, Figs. 1 and 2) has already been indicated. It may be added that *Piersoni* created a furore in the horticultural world when first introduced but is very little grown now owing to its tendency to revert, or throw once-pinnate leaves together with its twice-pinnate ones. The other two, *elegantissima* (Fig. 3) and *elegantissima-compacta* (Fig. 4), are both direct sports from *Piersoni* in which a greater division of the leaf exists. They thus correspond to *Whitmani* in division. *Elegantissima-compacta* also illustrates dwarfing.

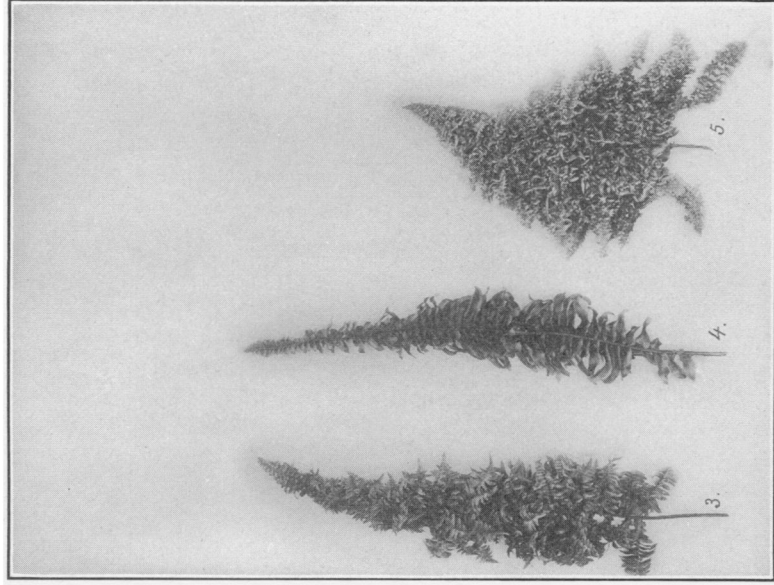
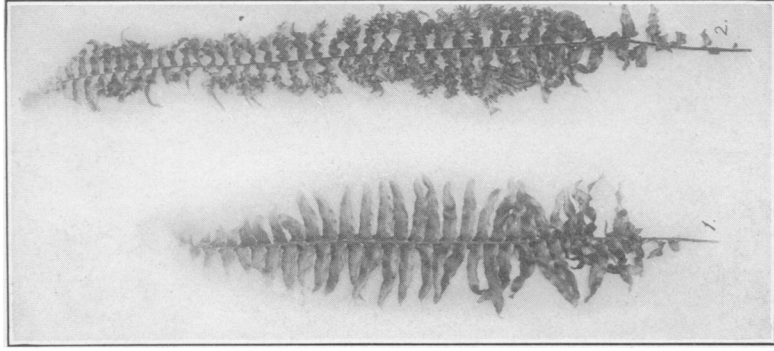
Plate 3 shows another dwarf sport from *Piersoni*, one in which no increase in division has taken place, *superbissima*, (Fig. 3). Figure 5 of the same plate shows *muscosa*, a sport of *superbissima*, showing an increase in division and possibly also further dwarfing.

The other figures of Plate 3 illustrate reversionary varieties of two different forms. "Dwarf Boston"

¹ Cf. "Some modern varieties of the Boston fern at their source," Journ. N. Y. Botanical Garden, 16: 194-197, plates 161 and 162. Sept. 1915. The privilege of reproducing these two plates is hereby gratefully acknowledged.



THE BOSTON FERN AND SOME PIERSON VARIETIES
 1, *bostoniensis*. 2, *Piersoni*. 3, *elegantissima*. 4, *eleg. compacta*
 (Reprinted from the Journ. N. Y. Bot. Gard. 16; Pl. CLXI)



MORE PIERSON VARIETIES OF THE BOSTON FERN
 1, "Dwarf Boston." 2, unnamed sport of *eleg. compacta*. 3, *superbissima*. 4, *viridissima*. 5, *muscosa*.
 (Reprinted from the Journ. N. Y. Bot. Gard. 16: Pl. CLXII)

(Fig. 1) and the unnamed sport (Fig. 2) both are sports from *elegantissima-compacta*, the first representing a full reversion to a once-pinnate condition, the second, a partial reversion, since it has lobed pinnae. *Viridissima*, (Fig. 4) is the revert of *superbissima*, and shows the stiff dwarf leaf of this variety together with its twisted pinnae. In general, reversion is a most prolific source of new varieties. All more than once pinnate forms tend to produce reverts but these appear never to go all the way back to *bostoniensis*, nor do they ever exactly agree with each other.

It should be noted that almost all of these varieties are vegetatively produced. Few or no fertile spores develop, the sporangia seeming generally abortive. New plants are grown from runners which spring from near the bases of the leaves.

For house cultivation, the old Boston is still the best. Next come large once-pinnate forms with wavy pinnae, *Harrisi* and *Roosevelti*, and the once-pinnate dwarfs, *Scotti* and *Teddy Jr.* *Whitmani*, *elegantissima*, and *Scholzeli* are the best sorts of the two to three pinnate. The more finely divided varieties are extremely beautiful but require greenhouse conditions for good development. Plants of these kinds should be renewed from florists' stock from time to time just as one buys cut flowers, only these fern plants will last months instead of days. It may be mentioned finally that the Boston fern with its varieties constitutes the most popular house plant in America today and is grown for this purpose in greater numbers than any other fern or flowering plant. It is safe to say that a million plants are grown and sold in the Eastern States alone every year.

BOTANIC GARDEN, BROOKLYN, N. Y.